

## REMARKS

### Introductory Comments

As of the mailing date of the 01/12/2010 Office Action, claims 1-17 were pending in the present application. In the present Response, no claims have been canceled, amended, or added, so claims 1-17 remain for consideration upon entry of the present Response. Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

### Provisional Nonstatutory Double Patenting Rejections

Claims 1-3, 8-10, 12-15, and 17 remain provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6, 12, 14, and 19 of copending Application No. 10/568,458. 01/12/2010 Office Action, page 2, second paragraph.

Applicants respectfully assert that claims 1-3, 8-10, 12-15, and 17 are patentable over claims 1-6, 12, 14, and 19 of copending Application No. 10,568,458 because the cited claims of the cited copending application do not teach or suggest depolymerization or the use of starch, let alone depolymerization of starch.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a *prima facie* case of obviousness requires that all limitations of the claim be taught or suggested by the prior art. *See, e.g., CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003); *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974).

Applicants' claim 1, which is the only pending independent claim, is reproduced below:

1. (Previously Presented) A method for depolymerizing starch comprising  
mixing a starch material with an ionic liquid solvent comprising a cation and an anion to dissolve the starch, and then

treating the dissolved starch by agitating at a temperature and for a period for time to effect depolymerization of the starch into desired depolymerization products.

Claim 1 requires starch in the “mixing a starch material” and “treating the dissolved starch” clauses. Setting aside any question of whether the preamble is limiting, depolymerization is clearly required by the clause “treating the dissolved starch by agitating at a temperature and for a period for time to effect depolymerization of the starch into desired depolymerization products” (emphasis added). Thus, claim 1 clearly requires depolymerization of starch.

The cited claims of the cited copending application do not teach or suggest the use of starch, nor do they teach or suggest depolymerization. Accordingly, the cited claims of the cited copending application do not support a *prima facie* case of obviousness. In a prior explanation of the present rejection, the Office stated, “It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the method for treatment of lignocellulosic material of copending Application 10/568,458 to treat a simpler molecular of polysaccharide (starch)”. 06/24/2009 Office Action, sentence bridging pages 2 and 3. This unsupported and conclusory statement cannot substitute for establishing that all limitations of the claims are taught or suggested by the prior art. Accordingly, a *prima facie* case of obviousness has not been established.

Applicants therefore respectfully request the reconsideration and withdrawal of the provisional rejection of claims 1-3, 8-10, 12-15, and 17 on the ground of nonstatutory obviousness-type double patenting over claims 1-6, 12, 14, and 19 of copending Application No. 10/568,458.

#### Obviousness Rejections over Swatloski

Claims 1, 2, 9-14, and 17 remain rejected under 35 U.S.C. § 103(a) as unpatentable over Swatloski et al. (WO 03/029329). 01/12/2010 Office Action, page 2, third paragraph.

International Publication No. WO 03/029329 A2 of Swatloski et al. (hereinafter “Swatloski”) generally describes dissolving cellulose in an ionic liquid without

derivatization, and regenerating the cellulose in a range of structural forms without requiring the use of harmful or volatile organic solvents. Swatloski abstract.

Applicants respectfully assert that claims 1-2, 9-14, and 17 are patentable over Swatloski because Swatloski does not teach or suggest the depolymerization of starch that is required by Applicants' claims.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a *prima facie* case of obviousness requires that all limitations of the claim be taught or suggested by the prior art. *See, e.g., CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003); *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974).

As noted above in the context of the provisional obviousness-type double patenting rejection, Applicants' claim 1, the only independent claim, clearly requires depolymerization of starch. Applicants respectfully assert that Swatloski does not teach or suggest depolymerization of starch because Swatloski does not teach or suggest the use of starch and it is at best unclear whether Swatloski teaches or suggests depolymerization.

With respect to the question of whether Swatloski teaches or suggests depolymerization, Applicants previously argued that "Swatloski et al. does not disclose or suggest depolymerization of polysaccharides, but illustrates by means of examples how a dissolved pure cellulose can be precipitated as long-chained cellulose." 10/23/2009 Amendment, page 7, last full paragraph. On further study of Swatloski, Applicants believe that this previous statement might have been too strong in view of two passages of Swatloski that, while not expressly teaching the occurrence of depolymerization, might raise a question about whether depolymerization can occur under some circumstances. Specifically, Swatloski at page 19, first full paragraph states, "Microwave heating significantly enhances the dissolution of cellulose in ionic liquids. Microwave-induced dissolution of cellulose in ionic liquids is a very quick process so that decay of the degree of polymerization is reduced." And Swatloski at page 31, first

paragraph states, “A single broad band was observed, characteristic of an amorphous material. This may indicate a slow breakdown of the polymer chains with time, as is observed after the swelling of cellulose in liquid ammonia to generate the cellulose III form.” On the other hand, Swatloski at page 31, third full paragraph makes clear that a lack of crystallinity can be attributed to the method of precipitation rather than a breakdown of polymer chains:

In these particular studies, the powdery regenerated floc showed an amorphous diffraction pattern with no crystallinity . . . These results indicate that the degree of crystallinity (and hence, microstructure) of the cellulose can be manipulated during the regeneration process to manufacture materials with microcrystallinity varying from crystalline to amorphous.

Swatloski, page 31, third full paragraph. Given these teachings, Applicants respectfully submit that Swatloski does not clearly teach or suggest depolymerization and instead at most raises a question about whether depolymerization can occur under some circumstances.

Independent of the question of whether Swatloski teaches depolymerization, it is clear that Swatloski does not teach or suggest depolymerization of starch because Swatloski does not teach or suggest the use of starch. Applicants respectfully note that the Office has not established that Swatloski teaches or suggests the use of starch. Instead, the Office appears to be arguing – without support from any reference – that it would have been obvious to substitute starch for Swatloski’s cellulose. 01/12/2010 Office Action, page 3, second full paragraph (“Since the composition of Swatloski can dissolve cellulose, it would expect one skilled in the art at the time the invention was made to apply the composition of Swatloski to starch as the instant claims as set forth in the office action mailed on June 24, 2009.”); 06/24/2009 Office Action, page 4, fifth paragraph (“It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teachings of Swatloski et al. into the treatment for starch to obtain the invention as specified in the claim 1, motivated by the fact that the cellulose and its derivatives can be used as a substituted source of polymers for applications in paints, plastics and other formulation materials (page 1, paragraph 2).”). Such conclusory

statements unsupported by any starch-teaching reference cannot substitute for establishing that all limitations of the claims are taught or suggested by the cited prior art. Accordingly, a *prima facie* case of obviousness has not been established.

Applicants therefore respectfully request the reconsideration and withdrawal of the rejection of claims 1, 2, 9-14, and 17 under 35 U.S.C. § 103(a) over Swatloski.

Obviousness Rejections over Swatloski + Bergstrom

Claims 3-8, 15, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Swatloski in view of Bergstrom et al. (US 4,000,032).

Swatloski is described above.

U.S. Patent No. 4,000,032 to Bergstrom et al. (hereinafter “Bergstrom”) generally describes a process for freeing cellulose fibers from lignocellulosic material, which comprises subjecting particulate lignocellulosic material to irradiation at a frequency within the range from about 10 to about 300,000 MHz (megahertz), at an intensity of at least 0.5 megajoule per kg. of material, applied in a short pulse having a duration of at most 0.1 second, at such an intensity the water present in the lignocellulosic material is rapidly and even explosively vaporized, and disrupts or destroys the natural structure of the lignocellulosic material, thereby freeing the fibers substantially without deleterious effect upon the length or strength of the fibers. Bergstrom abstract. Bergstrom is cited for its use of superatmospheric and subatmospheric pressures. 06/24/2009 Office Action, page 6, third paragraph.

Applicants respectfully assert that claims 3-8, 15, and 16 are patentable over Swatloski in view of Bergstrom because the cited references do not collectively teach or suggest depolymerization of starch.

Claims 3-8, 15, and 16 each depend ultimately from and further limit claim 1. As described above in the context of the obviousness rejection over Swatloski alone, Applicants’ claim 1 requires depolymerization of starch, whereas it is at best unclear whether Swatloski teaches or suggests depolymerization and in any case the Office has

not established that Swatloski teaches or suggests the use of starch. So, Swatloski does not teach or suggest depolymerization of starch, and Swatloski does not support a *prima facie* case of obviousness against claims 3-8, 15, and 16. Bergstrom, which is cited for its use of superatmospheric and subatmospheric pressures, does not cure the deficiencies of Swatloski. Specifically, the Office has not established that Bergstrom teaches or suggests depolymerization or the use of starch, let alone the depolymerization of starch. The combination of Swatloski and Bergstrom thus fails to support a *prima facie* case of obviousness against claims 3-8, 15, and 16.

Applicants therefore respectfully request the reconsideration and withdrawal of the rejection of claims 3-8, 15, and 16 under 35 U.S.C. § 103(a) over Swatloski and Bergstrom.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is respectfully requested.

It is believed that all the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

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